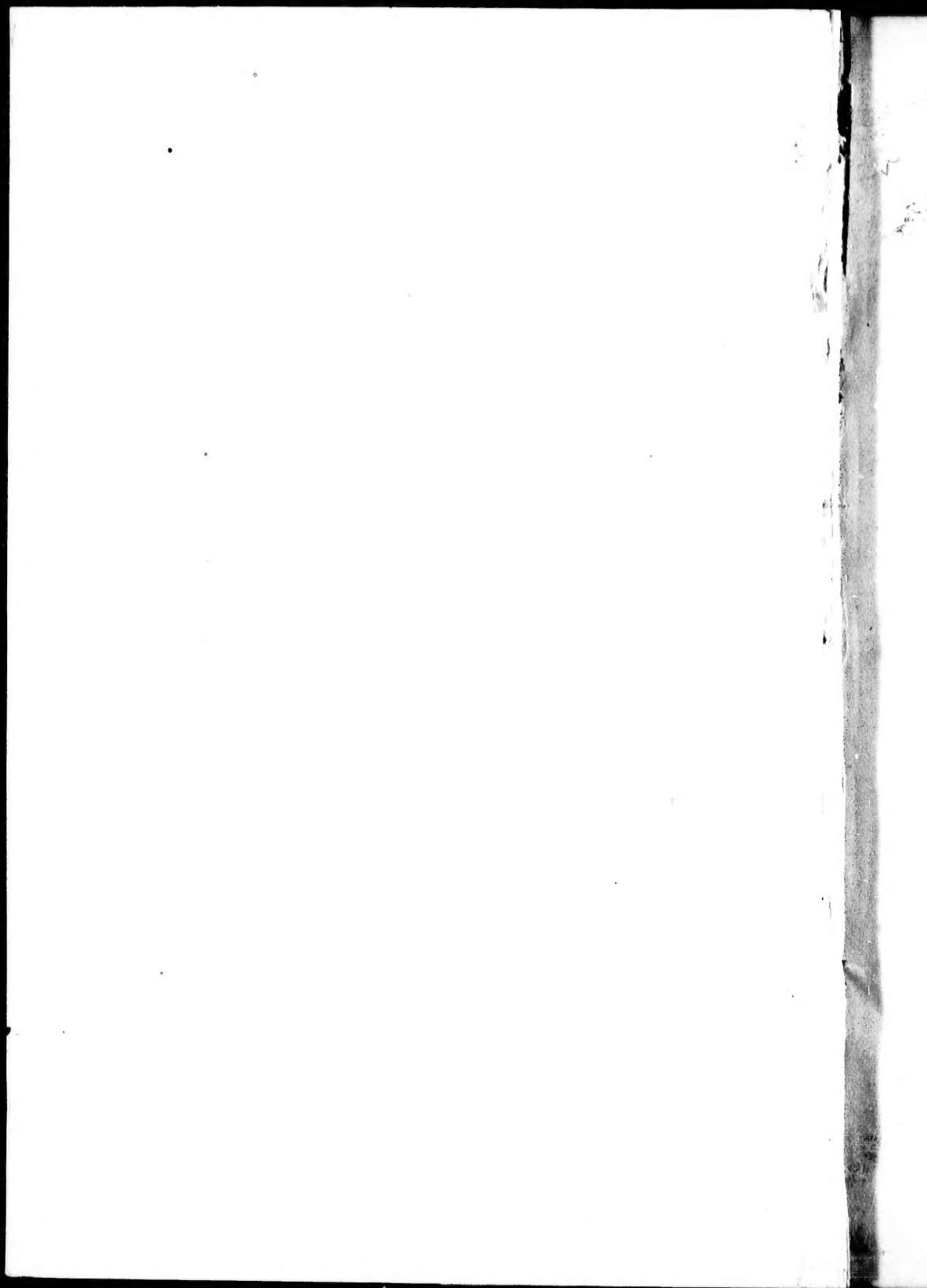




HINTS

TO THE

YOUNG BOTANIST,

HOW TO COLLECT, PRESERVE AND ARRANGE PLANTS
FOR THE HERBARIUM.

BY

JAMES BARNSTON, M.D., EDIN.,
PROFESSOR OF BOTANY IN THE UNIVERSITY OF MCGILL COLLEGE,
MONTREAL.

From the Canadian Naturalist and Geologist.

Montreal :

PRINTED BY JOHN LOVELL, CANADA DIRECTORY OFFICE, ST. NICHOLAS STREET.

1857.

1854
(13)

HINTS

TO THE

YOUNG BOTANIST,

HOW TO COLLECT, PRESERVE AND ARRANGE PLANTS
FOR THE HERBARIUM.

The season for collecting plants in the vicinity of Montreal may be said to commence towards the latter end of April and to extend to the beginning of October. But few plants will reward the early excursions of the botanist, who will measure their value and interest proportionally. Immediately on the melting of the snow, appear the *Hepatica triloba*, with its purplish-white flowers, the *Sanguinaria Canadensis*, with its palmate-lobed leaf and rich white flower, and the delicate *Claytonia*, with its pretty rose-colored corolla, and the discovery of even one of these floral pioneers in early spring gives as much gratification to the mind of the excursionist, as the richer and more luxuriant collections of midsummer. The Composite plants of August and September, the waving Grasses, the Ferns with their handsome fronds, and the delicate tufted Mosses adorn the autumnal season, whose close is marked by the bright and picturesque tints of leaves that once were green. The varieties of flowers characteristic of spring, summer and autumn, form a pleasing contrast to the mind, and this circumstance alone stimulates the enthusiasm of the botanist to continue his researches sedulously in the field till plants be no more.

The young botanist, who commences the collection and preserving of plants, should determine to prosecute his labours with zeal and assiduity. Without this ennobling spirit, he will ere long find what he at first considered a pleasure, to become an arduous task, fruitful of no enjoyment. His excursions to the country should be frequent, and as varied as possible; visiting mountain, hill, field, forest, valley, marsh, island, river and lake-shores. He should make a point, also, of collecting and preserving specimens of every plant that crosses his path, in order to render his herba-

rium a complete one. He can adopt no better plan at the beginning than to confine himself to a certain well-defined district, and to collect all the plants within it. When his herbarium of the district is complete, it will be of greater value than a larger but more scattered collection, and should opportunity permit, he can readily extend his researches over a wider range of country. To a resident in Montreal, its Mountain, so rich in plants and so near at hand, affords facilities for the formation of a beautiful herbarium of no small size, or the Island itself, if botanized throughout its whole extent, will furnish a characteristic collection of plants, many of them to be found within an extended range of latitude and longitude on either side. To relieve the monotony of a botanical excursion, it is advisable to be accompanied by one or more companions, who, besides affording pleasant society, will often be more fortunate in finding plants, and none more willing to favor another with duplicate specimens.

On starting upon a botanical excursion, it is requisite to be equipped with convenient apparatus for collecting and carrying plants. The following may be mentioned among the instruments most required :

I. A good *stout pocket-spud* or *digger*, made of steel, and furnished with a slightly curved wooden handle, pierced to allow a string to pass through, whereby it may be attached to a strap or belt round the waist. It will often be found useful in digging out roots and detaching plants from the crevices of rocks. If it be not obtained, a very good substitute is a *strong broad knife*, which may be sharp on both edges, and introduced into a leather sheath made for the purpose. It will also serve to cut the branches of shrubs and trees.

II. A *Vasculum* or *Tin Box*, for the purpose of carrying plants. This should be of sufficient dimensions to hold full sized specimens. A proper sized vasculum should be from 17 to 20 inches long, 7 to 9 inches wide and about 5 inches deep, and convex on the sides, so as to give more room within. The lid should be of large size and well secured against accidental opening. Two loops may be placed on the lower surface to receive a strap, by means of which the box may be carried on the back or side. A vasculum of smaller size may also be carried for the purpose of receiving more delicate plants, Ferns, Mosses, &c.

III. A Botanical *Field Book* will always be found convenient to preserve plants with very delicate flowers or leaves. It consists

of two boards, between which is placed a quantity of absorbent paper in folded sheets, forming from twelve to twenty-four layers. The plants are carefully placed between these layers of paper, and subjected to immediate pressure by means of leather straps attached to the boards. The field Book may be made of any size to suit the fancy of collector. An ordinary portfolio containing bibulous paper will answer equally well, provided a uniform pressure can be applied to the plants.

IV. A *Pocket Lens* or small magnifying glass will sometimes be of use in examining the fruit of Ferns, Mosses, &c., as well as the very delicate fresh-water *Algae* and microscopic *Fungi*. It should therefore be in every botanical traveller's pocket.

In collecting botanical specimens, it should be made a rule, that, as far as practicable, the entire plant should be taken with its root, stem, leaves and flowers. The specimen cannot be said to be perfect without the fruit and seed; hence, should these not be obtained when the plant is in full flower, they can be gathered at a later season. If the plant be too large to be taken entire, it will suffice to possess a flowering branch, the fruit and some well formed leaves. In this case, the collector should observe the characters of the parts not taken, as the bark, roots, &c., and also notice the form and size of the plant, more especially if it be a shrub or tree. Another point to be attended to is the collection of more than one specimen of each species, which, after drying, will enable the botanist to make choice of the finest specimen for his herbarium and give him the advantage of having duplicates for exchange with other botanical collectors. As soon as gathered, the plants are to be carefully placed in the vasculum in such a way as to prevent injury to the flower and crushing of the leaves. If small and very delicate, and more especially, if the flower be tender and deciduous, they should be immediately pressed between the layers of bibulous paper in the Field Book or Portfolio, care being taken to arrange the parts so as to preserve the natural habit and appearance of the whole plant. Some plants may be gathered from different localities and any variations observed are to be noticed. Should this be done over extensive districts, the geographical range of distribution will in many instances be ascertained and will constitute a valuable desideratum in this country. Monstrosities, which are interesting in a morphological point of view, should likewise be preserved and the circumstances in which they were found, mentioned. In an excursion, notice

may be taken of the general features of the country, scenery, &c., as these will be of much value for subsequent reference.

On returning from a botanical travel, it should be the object of the collector to name all the plants he has gathered and subject them to pressure immediately. It is much more easy to examine the characters of a plant when it is fresh, and the flower can be more readily dissected for the purpose of ascertaining the relations and dispositions of its parts, which are always referred to in botanical descriptions.

For the purpose of drying plants, it is necessary to have the following apparatus :

I. *Absorbent Paper*, of good texture, and large size—say 18 inches long by 11 broad. This will answer all ordinary plants, but in the case where the flowers or leaves are delicate and cannot easily be transferred, it is advisable to place them first within a sheet of thin crown tea paper or fine blotting paper, from which they are not to be removed till the second or third changing. There should always be a sufficient quantity of absorbent paper at hand for placing the plants newly collected, and for changing older collections in process of drying. As soon as the wet paper is removed, it should be hung up or spread out to dry, so as to be ready for use when required.

II. *Boards*. These are intended to be placed at certain intervals between the absorbent paper, say at a distance of two inches, in order to preserve a uniform pressure. They should be of the same size as the paper, and about $\frac{1}{4}$ of an inch in thickness. There should also be two boards, $\frac{3}{4}$ of an inch thick, to serve as strong outside boards—one underneath, the other above. Sheets of firm pasteboard are sometimes convenient for separating plants with stout woody stems from the more delicate ones, and thus preventing injury. They are also useful for packing up collections of dried plants temporarily.

III. A *Lens*, a small *Knife* or *Scissors*, and an ordinary *pair of Forceps*, should always be on the table for use when required. A sufficient number of small slips of paper should be cut for the purpose of writing down the Name of each plant, the Order to which it belongs, its *Habitat* or place where found, the *Date* of gathering, and any other remarks that may be considered worthy of notice—more especially in relation to deviations in form, size, locality of growth, &c., &c. These slips or labels should be placed beside the plants to which they refer.

IV. *Weights* are required to apply pressure to the plants after being arranged in the paper. If there be but one weight, it should be placed exactly upon the centre of the upper outside board, and should not be less than 100 pounds. It is preferable to have two or three different weights, so as to vary the amount of pressure from 60 to 120 pounds, according to the wet or dry state of the plants—those having been pressed for a week or so and more or less dry, not requiring so heavy a weight as previously. Some Botanists use screw-presses by which they are enabled to regulate the amount of pressure according to circumstances, but they are far from being so convenient as the ordinary weights.

Being thus furnished with the necessary apparatus, the collector adopts the following mode of pressing the plants and preparing them for the herbarium. One of the outside boards is placed upon the table immediately in front of him, and over it two sheets of absorbent paper. Upon this he spreads out one or more specimens according to their size, and arranges the parts in such a manner as to preserve as much as possible the natural habit and appearance of the whole plant. Should the plant be too large for the paper, it is to be folded upon itself and the flexure may be retained by passing it through a slip of paper, slit half an inch more or less for the purpose. The label containing the name, &c., of the plant is then to be placed with it, and the whole is to be covered by four or six sheets of paper. In doing this gradually from below upwards, care should be taken that every part of the plant be well spread out. The right hand will effect this easily, with the assistance of the knife or forceps, if required. The next specimen or set is to be arranged upon this in the same way, and a similar number of sheets laid over it, repeating the process till it is thought necessary to insert a thin board in order to preserve uniform pressure. Other parcels of paper and specimens are arranged in like manner above it, and so on, till all the plants are prepared, when the second outside board is to be placed on the top, the whole removed to a safe corner and the necessary weight, as formerly mentioned, applied. The plants are to be transferred from wet to dry paper with the utmost care, using both hands and the forceps, when necessary. The first changing should be within twelve hours, and the second likewise after the first, as a general rule. For the following five or six days, a change every twenty-four hours will suffice, after which the interval may be extended more or less. A pressure of ten or fourteen days will

effect the drying of most plants, and such as are properly dried should be removed and the remainder continued under pressure. Some succulent plants are very tenacious of life and will sprout even under great pressure. To prevent this, they must be immersed in boiling water for six or eight minutes, then dried with a towel and put between a double quantity of paper. The great point in drying plants is to effect the object as rapidly as possible, for then they are most likely to retain their natural appearance and colour.

A few other special directions, which have been omitted, may be mentioned here. For example, roots should be well washed and dried or otherwise cleaned before putting the plant in paper; bulbs, if large, should be slit in half or partially scooped out; large dry fruits may be wrapped in paper with the name of the plant to which they belong, and afterwards placed with them in the herbarium, while large succulent fruits may be preserved in wide-mouthed, glass-stoppered bottles, containing alcohol, or a strong solution of salt and water, or pyroligneous acid diluted with little more than one-half of water. It is likewise advisable to preserve seeds in separate parcels of paper, to prevent their being scattered or lost. As soon as the specimens are thoroughly dried, they should be removed and either prepared at once for the herbarium, or placed in sheets of smooth thin paper, with name, &c., and temporarily stowed away, till a more convenient time permit their proper arrangement. The Botanist should make choice of the best and most perfect specimens for his own herbarium, and the remaining plants should always be carefully preserved for the purposes of exchanges, donations, &c. He will be frequently called upon by other collectors, and his botanical generosity will always prove as much a source of gratification to himself as to the recipient of his favors. Nor is it a lost gift, as ere long he is doubly paid by the bounty of him whom he once befriended.

In forming a herbarium, it is necessary to place the plants either in stiff portfolios or volumes, which may be numbered, or in wooden cases or boxes, say 4 inches deep, with a double lid, one on the top and the other on the front side. If the collection, however, is likely to become large, it is preferable to get a cabinet made specially for the purpose, having folding doors and containing sliding drawers or trays, whose measurement should be as follows: length 19 inches, breadth $11\frac{1}{2}$ inches, and depth 4 inches.

The trays may number twenty or twenty-four, disposed in two rows, but the size of the cabinet depends on the collector himself who is better able to judge of his requirements.

Having wherein to place his plants, he now prepares them finally for preservation. For this purpose, he must have a quantity of good thick white paper, cut in single sheets, and measuring 17 inches in length and 10½ inches in width.* In all herbaria, the plants should be fastened to the paper by white thread or, what is better, by means of thin fine glue, or a solution of gum Arabic and gum Tragacanth in a sufficiency of water. The mode of procedure is as follows: The operator places a sheet of paper in front of him and lays the plant to be fastened to it upon a newspaper on his left side, with its upper surface undermost. The glue is then applied carefully to its under surface by means of a camel's hair pencil, immediately after which, the plant is to be lifted and turned by the fingers or forceps and transferred to the sheet of paper upon which the root, stem, leaves and flowers are to be slightly pressed. Two or even three specimens of the same species may be placed on the sheet, provided there be sufficient room. The name of the plant is then to be neatly written at the bottom of the sheet, generally on the right hand side, with its locality or habitat, date of collecting, and other particulars if worthy of notice. As soon as this is done, the specimen is to be put under a slight and uniform pressure for an hour or two and afterwards removed to its proper place in the cabinet. The other specimens are to be prepared in the same way, and should the stems be strong and thick, they may be more firmly secured by narrow strips of gummed paper, laid transversely across. In order to preserve the specimens from the attacks of insects, they may be lightly touched with a solution of corrosive sublimate in camphorated spirit, say half a drachm to the ounce.

The plants thus prepared for being received into the herbarium, are to be arranged according to some approved method of classification. Of the Natural Systems, the one adopted by Professor Asa Gray in his "Manual of the Botany of the Northern United States," has many advantages, and recommends itself to the botanical collector in Canada on account of its application to the Botany of those countries immediately adjoining this Province, a

* The best paper of the kind is that sold by Messrs. Weir & Dunn, of this city, under the name of B. Laid Medium 34 lbs, flat (Mill 60.)

vast number of whose plants grow in common with the Northern States. With the "Manual" as a guide, there will be no difficulty in arranging the plants and classifying them according to their exact relations.

In placing them in the herbarium, all the Species of a Genus should be put together, and each Genus should be marked and separated by a single sheet of firm coloured paper of fine texture. The plants included in each Natural Order should be inserted within a sheet of larger and stiffer paper, as cartridge paper, to which the name of the Order is attached so as to be readily seen when reference requires to be made to it. The only other points of importance regarding the herbarium are, that it should be well secured under lock and key and put in a safe and dry place, and the trays subjected to an occasional airing to prevent the adhering of moisture to the paper, and thus preserving the specimens from becoming mouldy.

Northern
no diffi-
culty to

of a Genus
marked and
the texture.
The inserted
paper, to
readily seen
other points
should be well
placed, and
adhering
specimens from